JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS & ECONOMICS

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION WITH IT

3RD YEAR 2ND SEMESTER 2019/2020 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: ABA 315

COURSE TITLE: Quantitative Methods in Business

EXAM VENUE: **STREAM: (BBA ACCOUNTING OPTION)**

DATE: **EXAM SESSION:**

TIME: 2   HOURS

Instructions:

1. **Answer Question ONE (COMPULSORY) and ANY other 2 questions**

2. **Candidates are advised not to write on the question paper.**

3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE

a) Define the following terms as used in quantitative methods

    i.   Economic order quantity.

    ii.   Inventory.

    iii.   Critical path.

    iv.   Decision theory.

    v.   Forecasting.   [5 marks]

b) A firm is considering the purchase of a complex piece of equipment from either of the two suppliers S_1 and S_2. The supplier S_1 is capable of supplying the equipment on time to meet a certain desired deadline. The price chargeable by S_1 is, however, considerable higher than that of S_2. It is felt by the management of the firm that S_2 may deliver the equipment, or may not be able to deliver on time. It is even suspected that the supplier S_2 may never be able to deliver the equipment to the specifications. However, the management believes that if it waits for some months, it may get better information on S_2's capabilities of supplying the equipment. The management is considering three alternative courses of action.

A1 Order from S_1. If later it is clear that S_2 can supply, the order from S_1 can be canceled.

A2 order from S_2. If it is known that S_2 cannot supply the equipment, the order may be switched to S_1.

A3 wait until the time information S_2's capabilities are known. This would obviously cause delay.

The profits in the various situations are:

Event Course of Action

	A1	A2	A3
E1	250	100	200
E2	125	125	300
E3	250	625	450

Where E1 = S_2 fails to deliver, E2 = S_2 delivers late, E3 = S_2 delivers on time.

What would be the management's decision according to the following criteria?

   i.   Minimax.

  ii.   Maximin.

 iii.   Savage. [6 marks]

c) An MBA student applies for a job in two firms X and Y. The probability of his being selected in firm X is 0.7 and being rejected at Y is 0.5. The probability of atleast one of his applications being rejected is 0.6. What is the probability that hewill be selected in one of the firms? [5 marks]

d) Differentiate the following

   i. $y = 3/x^2$

  ii. $y = 4x^3 - 12x^2 + 3x + 12$[3 marks]

a) Draw a network for the following activity list.

Activity	Preceding activity
A, B	-
C, D	A
E	B
F	C
G	D, E[5 marks]

b) The marginal cost and the marginal revenue of a commodity are given by $C'(x) = 20 + 0.05x$ and $R'(x) = 30$. The fixed cost is $200. Determine the maximum profit. [6 marks]

QUESTION TWO

a) Find the equilibrium price and the equilibrium quantity for the following demand and supply functions.

$Q_d = 4 - 0.06p$ and $Q_s = 0.6 + 0.11p$. [3 marks]

b) Two computers A and B are to be marketed. A salesman who is assigned the job of finding customers for them has 60% and 40% chances respectively of succeeding in case of computer A and B. The computers can be sold independently. Given that he was able to sell at least one computer, what is the probability that computer A has been sold? [6 marks]

c) The marginal cost function of manufacturing x units of a commodity is $6 + 10x - 6x^2$. Find the total cost and average cost, given that the total cost of producing 1 unit is Khs. 15. [6 marks]

d) Briefly explain FIVE reasons of studying time series analysis. [5 marks]

QUESTION THREE

a) The demand curve for a monopolist is given by $x = 100 - 4p$.
   i. At what the value of x, is the marginal revenue equal to zero?
   ii. Find the total revenue, average revenue and marginal revenue. [6 marks]

b) Find the stationary points and the stationary values of the function $f(x) = 2x^3 + 3x^2 - 12x + 7$.[7 marks]

c) Discuss briefly the components of a time series. [4 marks]

d) Discuss THREE main aims of forecasting.[3 marks]

QUESTION FOUR

a) A company uses annually 24000 units of raw materials which cost Ksh. 1.25 per unit, placing each order costs Ksh. 22.5 and the holding cost is 5.4% per year of the average inventory. Find

   i.   EOQ
   ii. Time between each order.
   iii. Also verify that at EOQ, carrying cost is equal to ordering cos.
   iv. Total number of orders per year.[10 marks]

b) A factory has a machine shop in which three machines (A, B, C)produce 100cm aluminum tubes. An inspector is equally likely to sample tubes from A and B, and three times as likely toselect tubes from C as he is from B. The defective rates from the three machines are:

   A 10%   B 10%   C 20%

   What is the probability that a tube selected by the inspector:

   i.   Is from machine A?
   ii. Is defective?
   iii. Comes from machine A, given that it is defective?   [10 marks]

QUESTION FIVE

a) Fit a trend line to the following time series data by the method of least squares hence estimate the trend values.

	Q_1	Q_2	Q_3	Q_4
Year 1	73	90	121	98
Year 2	69	92	145	107
Year 3	86	111	157	122
Year 4	88	109	159	131

[10 marks]

b) Differentiate between a global maximum and a relative maximum. [3 marks]

c) The following project describes the activities and their associated times necessary for sending a letter.

A. Letter dictated to secretary (5 mins)

B. Letter typed (10 min)

C. Envelope addressed by clerk(3 min)

D. Envelope stamped by clerk (1 min)

E. Clerk puts letter in envelope and seals(1 min)

F. Post letter (4 min)

Required:

i. Draw a network plan and include timings. [4 marks]

ii. Determine the critical path. [3 marks]